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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/795,941	03/08/2004	Paul E. McKenney	BEA920030026US1	1342

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ART UNIT	PAPER NUMBER
2162	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/795,941	MCKENNEY, PAUL E.	
	Examiner	Art Unit	
	Fred I. Ehichioya	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This is responsive to the communication filed March 28, 2007.

2. Claims 1 – 31 are pending in this Office Action.

Response to Arguments

3. Claim Rejections - 35 USC § 112

Applicant's argument regarding rejections under 35 U.S.C. 112, second paragraph of last Office Action is persuasive; therefore rejections under 35 U.S.C. 112, second paragraph is hereby withdrawn.

4. Claim Rejections - 35 USC § 101

Applicant's argument regarding rejections under 35 U.S.C. 101 of last Office Action is persuasive; therefore rejections are rejected under 35 U.S.C. 101 is hereby withdrawn.

5. Applicant argues:

a. McKenney at page 1, lines 12 – 16 merely discusses the fact that conventional read-copy update preserves the old state of an individual data element being updated. This does not guarantee the preservation of "group integrity" (page 11, paragraph 2).

Examiner respectfully disagrees with the applicant. Firstly, examiner submits that applicant's argument is based on the wrong reference. Secondly, Examiner submits that page 5 of last Office Action shows that "APA" the cited reference discloses updating a shared data element group while preserving group integrity on behalf of one or more readers that are concurrently referencing group data elements without using

locks or atomic instructions as shown on page 1, lines 12 – 16; APA further clarifies guaranteeing the preservation of group integrity at page 5, lines 9 – 11.

b. McKenney fails to discloses or suggest the recited claim limitation of assigning a generation number to a new data element that allows a reader of the data element group to determine whether the new data format is a correct version for the reader (page 12, paragraph 1).

Examiner respectfully disagrees with the applicant. Examiner submits that the generation sequence number are assigned to system calls when this system call begins. McKenney discloses this as shown on page 15, section 6.1 - "When operation such as system call begin", "A separate per-CPU generation sequence number is advanced every time a new is identified as current". McKenney also discloses Global generation number and generation number assigned to callbacks (see pages 16 – 17, Item 5, #3) These system callbacks are elements assigned generation sequence number each time a new system callback is identified. McKinney explains this in US Patent No. 6,886,162 Fig. 3 steps 108, 110 and column 7, line 24 that "callback" is an "element". US Patent No. 6,886,162 also shows in column 12, line 42 that "A generation counter tracks a global generation number".

Since McKenney discloses generation sequence number are assigned to callback on pages 15 and 16 as explained above, therefore McKenney discloses assigning a generation number to a new data element that allows a reader of the data element group to determine whether the new data format is a correct version for the reader (see page 15, section 6.1 and page 16, column 2, Item 5, #3).

c. Page 16, #3 of McKenney is assumed to be directed to the third element of "item 5." Here, the discussion is about global current generation counters, maximum generation counters, and per-CPU generation counters, all of which are used to track grace periods for callback processing purposes and none of which are associated with data element group (page 13, paragraph 2).

Examiner respectfully disagrees. As explained in response to argument (b) above, McKenney explains that callback is an element in US Patent No. 6,886,162. McKenney further explains using US Patent No. 6,886,162 in column 7, lines 35 – 36 that callback processor may process individual or group of elements; since applicant admits that the cited portion of McKenney is directed for callback processing, therefore. The cited potion of McKenney disclosed applicant claimed limitation. APA also discloses generating a new group data element as shown on Fig. 1A – 1D and page 2, lines 9 – 10 of the specification.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1 – 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art "APA" Specification pages 1 – 6 and Figs. 1A - 3 in view of Non-patent Literature "Read-Copy Update" by Paul E. McKenney et al., "MCKenney".

Regarding claims 1, 11 and 21, APA discloses a method for updating a shared data element group while preserving group integrity on behalf of one or more readers that are concurrently referencing group data elements without using locks or atomic instructions, comprising (page 1, lines 12 – 16):

one or more data storage media (page 3, lines 7 – 10: APA discloses a computer system which inherently includes "storage media");

means recorded on said data storage media for programming a data processing platform to operate as by (page 1, lines 16 – 19: APA discloses multiprocessor computing environments which inherently incorporating "routine" or programs for processing shared data):

generating a new group data element (Figs 1A – 1D and page 2, lines 9 – 10: APA discloses A, B and C as group of data elements).

if a prior version of said new data element exists, establishing a version link between said new data element and said prior version (page 3, lines 5 – 10);

linking said new data element into said data element group so that it is reachable by readers (page 2, lines 10 – 13); and

if a prior version of said new data element exists, freeing said prior version following a grace period (page 3,lines 19 – 21).

APA does not explicitly disclose generation number as claimed.

McKenney discloses assigning a generation number to said new data element that allows a reader of said data element group to determine whether said new data element is a correct version for said reader (page 15, column 1, section 6.1; "When

operation such as system call begin", "A separate per-CPU generation sequence number is advanced every time a new is identified as current". McKenney also discloses Global generation number and generation number assigned to callbacks (see pages 16 – 17, Item 5, #3) These system callbacks are elements assigned generation sequence number each time a new system callback is identified. McKinney explains this in US Patent No. 6,886,162 Fig. 3 steps 108, 110 and column 7, line 24 that "callback" is an "element". US Patent No. 6,886,162 also shows in column 12, line 42 that "A generation counter tracks a global generation number);

updating a global generation number associated with said data element group (page 15, section 6.1, paragraph 1, Fig. 29 and page 16, #3; McKinney explains this in US Patent No. 6,886,162 at column 12, line 42 that "A generation counter tracks a global generation number).

It would have been obvious to one of ordinary skills in the art at the time of the present invention to combine the cited references because McKenney's teaching of "generation number" would allow APA's system to categorize prior and current versions of data elements. The motivation is that this combined system significantly reduces complexity while simultaneously improving performance and scaling. This is achieved by the use of generation number that is incremented each time a new data element is identified that has the most current data for processing.

Regarding claims 2, 12 and 22, McKenney discloses wherein said method is used to replace a group data element and said new data element is generated by

copying said data element to be replaced (page 7, column 2, section 3, paragraph 4: "It is possible to perform an arbitrary read-copy-update modification of any data structure by making copy of the entire structure").

Regarding claims 3, 13 and 23, McKenney discloses wherein said method is used to delete a group data element (Figs. 6 and 9; and page 6, column 1, section 2.4) and said new data element is generated by copying said data element to be deleted replaced (page 7, column 2, section 3, paragraph 4) and setting a deletion flag in said new data element (replaced (page 7, column 2, section 3, paragraph 3: old data can be flagged . . . up-to-date data).

Regarding claims 4, 14 and 24, APA discloses wherein said method is used to insert a new group data element and said new data element has no prior versions (page 3, line 23 – page 4, line 4).

Regarding claims 5, 15 and 25, APA discloses wherein said method further includes generating a pointer-forwarding entity that points to said new data element, said pointer forwarding entity maintaining said version link on behalf of said new data element and further being used to link said new data element into said data element group (page 3, lines 1 – 5).

Regarding claims 6, 16 and 26, APA discloses a method for updating a shared data element group while preserving group integrity on behalf of one or more readers that are concurrently referencing group data elements without using locks or atomic instructions, comprising (page 3, line 23 – page 4, line 4):

one or more data storage media (page 3, lines 7 – 10: APA discloses a computer system which inherently includes "storage media");

means recorded on said data storage media for programming a data processing platform to operate as by (page 1, lines 16 – 19: APA discloses multiprocessor computing environments which inherently incorporating "routine" or programs for processing shared data):

generating a pointer-forwarding entity that points to a data element in said data element group (page 3, lines 1 – 5);

if there is a prior version of said pointer-forwarding entity, establishing a version link between said pointer-forwarding entity and said prior version (page 3, lines 5 – 10);

linking said pointer-forwarding entity into said data element group so that said data element pointed to by said pointer-forwarding entity is reachable by readers through said pointer-forwarding entity (page 2, lines 10 – 13); and

if a prior version of said pointer-forwarding entity exists, freeing said prior version following a grace period (page 3, lines 19 – 21).

APA does not explicitly disclose generation number as claimed.

McKenney discloses assigning a generation number to said pointer-forwarding entity that allows a reader of said data element group to determine whether said pointer-forwarding entity is a correct version for said reader (page 15, column 1, section 6.1; "When operation such as system call begin", "A separate per-CPU generation sequence number is advanced every time a new is identified as current". McKenney also discloses Global generation number and generation number assigned to callbacks (see pages 16 – 17, Item 5, #3) These system callbacks are elements assigned generation sequence number each time a new system callback is identified. McKinney explains this in US Patent No. 6,886,162 Fig. 3 steps 108, 110 and column 7, line 24 that "callback" is an "element". US Patent No. 6,886,162 also shows in column 12, line 42 that "A generation counter tracks a global generation number);

updating a global generation number associated with said data element group (page 15, section 6.1, paragraph 1, Fig. 29 and page 16, #3; McKinney explains this in US Patent No. 6,886,162 at column 12, line 42 that "A generation counter tracks a global generation number).

It would have been obvious to one of ordinary skills in the art at the time of the present invention to combine the cited references because McKenney's teaching of "generation number" would allow APA's system to categorize prior and current versions of data elements. The motivation is that this combined system significantly reduces complexity while simultaneously improving performance and scaling. This is achieved by the use of generation number that is incremented each time a new data element is identified that has the most current data for processing.

Regarding claims 7, 17 and 27, McKenney discloses assigning a current global generation number to said search (page 16, column 2, #3);

when referencing a data element in said data element group, determining whether said referenced data element is a correct version by comparing a generation number assigned to said referenced data element with said search generation number (page 15, column 1, section 6.1, paragraph 1); and

searching for a correct version of said referenced data element as necessary (page 17, column 1, paragraph 4).

Regarding claims 8, 18 and 28, McKenney discloses wherein, if said data element generation number is equal to said search generation number, said referenced data element is accepted for reading as a correct version (page 17, column 1, paragraphs 3 and 4).

Regarding claims 9, 19 and 29, McKenney discloses wherein, if said data element generation number is less than said search generation number, a search is made for a later version of said referenced data element, and wherein said referenced data element is used if a later version is not found (page 5, column 1, paragraph 3).

Regarding claims 10, 20 and 30, McKenney discloses wherein, if said data element generation number is greater than said search generation number, a search is made for a prior version of said referenced data element, and wherein said referenced data element is deemed to be a new insertion if there is no prior version (page 18, column 1, paragraph 2).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> Claim 31 is rejected under 35 U.S.C. 102(a) as being anticipated by APA.

Regarding claim 31, APA discloses a computer program product for managing a shared data element group so as to allow updates thereof while preserving group integrity on behalf of one or more readers that are concurrently referencing group data elements without using locks or atomic instructions, comprising:

one or more data storage media (page 3, lines 7 – 10: APA discloses a computer system which inherently includes "storage media");

means recorded on said data storage media for programming a data processing platform to operate as by (page 1, lines 16 – 19: APA discloses multiprocessor

computing environments which inherently incorporating "routine" or programs for processing shared data):

performing a first-phase update operation that preserves a consistent pre-update view of said data element group on behalf of pre-update readers and a consistent post-update view of the data element group on behalf of post-update readers (page 2, lines 1 – 8: APA discloses "first-phase update", "re-update view" and "post-update view" as shown in the above cited page and lines);

providing means by which readers can locate all data elements of said data element group that belong to each of said pre-update and post-update views as readers search said data element group (page 2, lines 3 – 6: APA discloses the operations that access the data following the update");

performing one or more read operations following said first-phase update operation in which one or more readers search said data element group with each reader referencing only data elements belonging to one of said pre-update and post-update views (page 2, lines 17 – 19: APA discloses multiple concurrent read operations); and

performing a second-phase update operation following a grace period that frees said pre-update view of said data element group (page 2, lines 6 – 8: APA discloses a second phase update following a grace period).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred I. Ehichioya whose telephone number is 571-272-4034. The examiner can normally be reached on M - F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on 571-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Fred I. Ehichioya
Patent Examiner
Art Unit 2162

June 6, 2007

Cam Y Truong
Primary Examiner